CLAIMS

WE CLAIM:

1. An energy storage flywheel system, comprising:

a housing assembly;

a flywheel assembly rotationally mounted in the housing assembly; and

one or more actuator assemblies mounted in the housing assembly, each actuator assembly configured to selectively (i) engage the flywheel assembly, to thereby inhibit movement thereof, and (ii) disengage the flywheel assembly, to thereby allow movement thereof.

2. The system of Claim 1, further comprising:

a control circuit configured to selectively supply an engage signal and a disengage signal,

wherein each actuator assembly is coupled to receive the engage and disengage signals from the control circuit and operable, in response thereto, to engage and disengage the flywheel assembly, respectively.

3. The system of Claim 1, further comprising:

one or more magnetic bearing assemblies mounted in the housing assembly, each magnetic bearing assembly adapted to be selectively activated and deactivated, and configured, when activated, to rotationally mount the flywheel assembly in non-contact manner,

wherein each actuator assembly is configured to engage the flywheel assembly when each of the magnetic bearing assemblies is deactivated, and disengage the flywheel assembly when each of the magnetic bearing assemblies is deactivated.

4. The system of Claim 3, further comprising:

a control circuit configured to selectively supply an engage signal when the magnetic bearing assembly is deactivated, and a disengage signal when the magnetic bearing assembly is activated,

wherein each actuator assembly is coupled to receive the engage and disengage signals from the control circuit and operable, in response thereto, to engage and disengage the flywheel assembly, respectively.

5. The system of Claim 4, wherein each actuator assembly comprises:

a solenoid coupled to receive the engage and disengage signals from the actuator assembly control circuit and operable, in response thereto, to move in an engage and disengage direction, respectively; and

an actuator coupled to the solenoid and configured to (i) engage the flywheel assembly when the solenoid moves in the engage direction and (ii) disengage the flywheel assembly when the solenoid moves in the disengage direction.

6. The system of Claim 5, wherein each solenoid is a latch-type solenoid.

7. The system of Claim 3, further comprising:

one or more mechanical bearing assemblies mounted in the housing assembly, each mechanical bearing assembly coupled to the flywheel assembly and configured to rotationally mount the flywheel assembly at least when each of the magnetic bearing assemblies is deactivated.

8. The system of Claim 3, further comprising:

a magnetic bearing control circuit adapted to receive bearing command signals and operable, in response thereto, to supply at least the activation and deactivation signals to each of the magnetic bearings.

9. The system of Claim 1, wherein the flywheel assembly comprises:

a shaft;

a flywheel hub coupled to and surrounding the shaft; and

a flywheel coupled to and surrounding the flywheel hub,

wherein each actuator assembly is configured to selectively engage and disengage the flywheel hub.

10. The system of Claim 1, wherein each actuator assembly, when engaging the flywheel assembly, inhibits both rotational movement and translational movement of the flywheel assembly.

11. An energy storage flywheel system, comprising:

a housing assembly;

a flywheel assembly rotationally mounted in the housing assembly;

one or more magnetic bearing assemblies mounted in the housing assembly, each magnetic bearing assembly adapted to receive (i) an activation command, whereby the magnetic bearing assembly rotationally mounts the flywheel assembly in non-contact manner or (ii) an inactivation command, whereby the magnetic bearing assembly does not rotationally mount the flywheel assembly;

one or more actuator assemblies mounted in the housing assembly, each actuator assembly adapted to receive (i) an engage signal, whereby the actuator engages the flywheel assembly against movment or (ii) a disengage signal, whereby the actuator disengages the flywheel assembly; and

an actuator assembly control circuit configured to (i) supply the engage signal to each actuator assembly at least when the inactivation command is supplied to the magnetic bearing assembly and (ii) supply the disengage signal to each actuator assembly at least when the activation command is supplied to the magnetic bearing assembly.

12. The system of Claim 11, further comprising:

a magnetic bearing controller adapted to receive bearing command signals and operable, in response thereto, to supply at least the activation and deactivation signals to each of the magnetic bearings.

13. The system of Claim 1, wherein each actuator assembly comprises:

a solenoid coupled to receive the engage and disengage signals from the actuator assembly control circuit and operable, in response thereto, to move in an engage and disengage direction, respectively; and

a lock mechanism coupled to the solenoid and configured to (i) engage the flywheel assembly when the solenoid moves in the engage direction and (ii)

disengage the flywheel assembly when the solenoid moves in the disengage direction.

14. The system of Claim 13, wherein each solenoid is a latch-type solenoid.

15. The system of Claim 11, further comprising:

one or more mechanical bearing assemblies mounted in the housing assembly, each mechanical bearing assembly coupled to the flywheel assembly and configured to rotationally mount the flywheel assembly at least when each of the magnetic bearing assemblies is deactivated.

16. The system of Claim 11, wherein the flywheel assembly comprises:

a shaft;

a flywheel hub coupled to and surrounding the shaft; and

a flywheel coupled to and surrounding the flywheel hub,

wherein each actuator assembly is configured to selectively engage and disengage the flywheel hub.

17. The system of Claim 11, wherein each actuator assembly, when engaging the flywheel assembly, inhibits both rotational movement and translational movement of the flywheel assembly.

18. A method of selectively inhibiting rotation of a rotationally mounted flywheel assembly, comprising:

engaging at least a portion of the flywheel assembly, to thereby substantially inhibit flywheel assembly movment; and

disengaging the flywheel assembly, to thereby allow flywheel assembly movement.

19. The method of Claim 18, wherein the flywheel assembly is rotationally mounted using one or more magnetic bearing assemblies that are each adapted to be selectively activated and deactivated, and configured, when activated, to rotationally mount the flywheel assembly in non-contact manner, and wherein the method further comprises:

engaging at least a portion of the flywheel assembly at least when each of the magnetic bearing assemblies is deactivated; and

disengaging the flywheel assembly at least when each of the magnetic bearing assemblies is deactivated.

20. The method of Claim 18, wherein the flywheel assembly movement that is substantially inhibited and allowed includes both rotational movement and translational movement.